INTERIM PERFORMANCE REPORT
South Carolina ProjectT-57-R-1
South Carolina Endangered Species Program
South Carolina Department of Natural Resources
October 1, 2011 – September 30, 2012

Project: South Carolina Reptile and Amphibian conservation

Job 1. Pine Barrens Treefrog

Objective 1. Continue surveys to determine status of pine barrens treefrog populations documented by Cely and Sorrow from 1980-1982. Survey additional sites within appropriate habitat, identified using GIS, aerial photography and soil maps, for presence of pine barrens treefrog.

Accomplishments.
The Pine Barrens Treefrog (PBTF), (*Hyla andersoni*), is listed as a Species in Need of Management (State Threatened) in South Carolina and is identified under the state's Comprehensive Wildlife Conservation Strategy as a highest priority species in need of conservation.

The Pine Barrens Treefrog has an unusual distribution pattern, occurring in three distinct geographic areas, the New Jersey pine barrens, the Fall-Line sandhills of North and South Carolina and the panhandle of Florida and eastern Alabama. Each of these population centers is separated from its nearest neighbor by several hundred miles. To date no records for this species exist for the areas between the known population centers.

In South Carolina the species is restricted to the northern sandhills (Figure1), with historic records in Richland, Kershaw, Chesterfield and Marlboro counties. In the early 1980's SCDNR biologists John Cely and Jim Sorrow surveyed this region for the PBTF, visiting sites previously documented by John Garton, A.J. Bullard and others, and a selection of potential new sites. Currently the SCDNR Heritage database contains 30 records for the PBTF, contributed by Cely, Sorrow, Garton, Bullard and other observers (Figure 1). Kevin Messenger provided 10 records (Figure 2) for the PBTF on SHNWR, two of which are new localities separate from any historic localities The remaining eight are either historic localities or within a few hundred meters of historic localities.

SCDNR staff used the historic records, GIS and topo maps to survey the SHNWR and adjacent areas of the SHSF for potential survey sites.

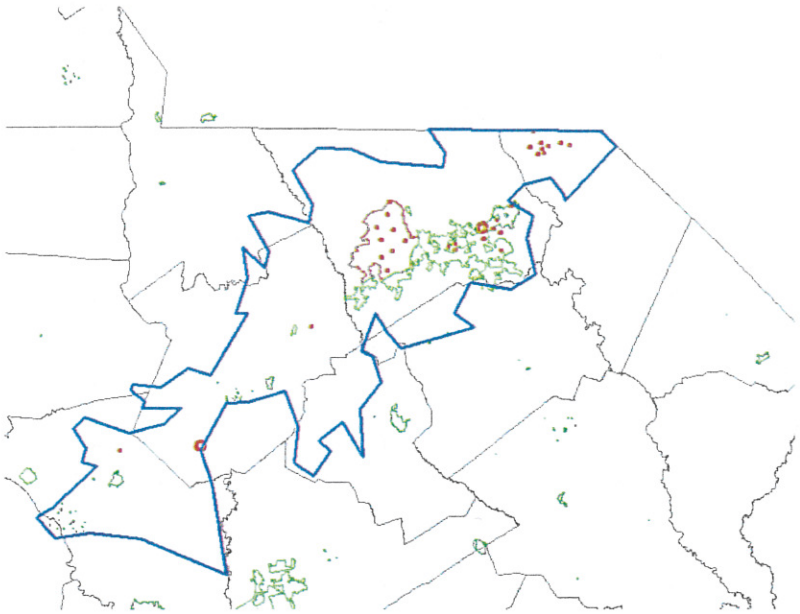

Figure 1. Northern Sandhills of South Carolina with historic pine barrens treefrog locations

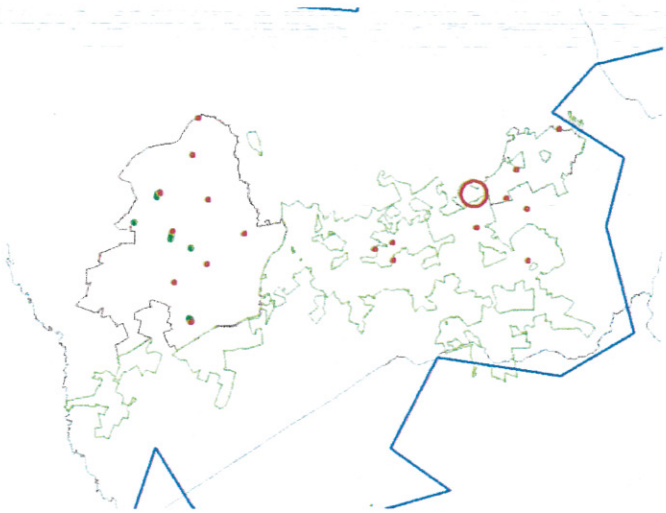

Figure 2. Historic locations (red) and locations provided by Kevin Messenger (green) for Pine barrens treefrog onSHNWR and SHSF

Objective 2. Work with Sandhills NWR, Cheraw State park and Sandhills State Forest to implement monitoring protocols, using automated recorders and call surveys for pine barrens treefrogs, which can be implemented by their staff.

Accomplishments.
During FY12 sampling for the pine barrens treefrog focused on SHNWR and adjacent portions of SHSF. During the spring and summer of FY12 automated recorders (Songmeter SM2, Wildlife Acoustics) were deployed at 22 sites on SHNWR and SHSF. Recorders were placed at, or near historic sites and several potential sites, as determined by the surveys from Objective 1 (Figure 3).

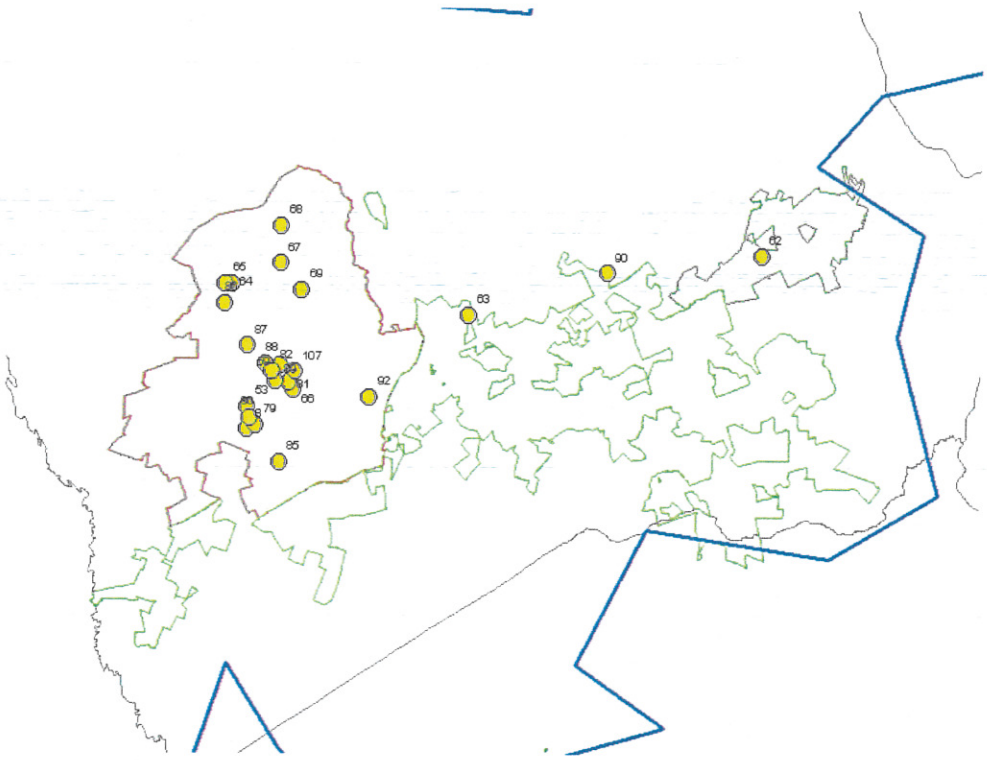

Figure 3. Location of recorder sites FY12

Automated recorders were initially placed at sample sites beginning in April and were left in place for varying amounts of time before being moved to other sites. Table 1 gives the starting and ending dates of recording for all sample sites. Recorders were left at their initial sites longer than the authors had originally intended, due primarily to the lack of rainfall during the spring. The authors considered it important to leave the recorders in place, at a site, until a significant rainfall occurred.

site	begin rec	end rec
8	1-Apr	13-Jun
53	9-Apr	13-Jun
59	9-May	13-Jun
62	2-May	1-Jul
63	2-May	28-Jun
64	2-May	25-Jun
65	2-May	25-Jun
67	2-May	25-Jun
68	2-May	25-Jun
69	2-May	25-Jun
79	14-Jun	31-Jul
82	25-Apr	13-Jun
85	26-Jun	16-Aug
86	26-Jun	3-Aug
87	27-Jun	27-Jul
88	27-Jun	3-Aug
89	27-Jun	26-Jul
90	9-Jul	18-Aug
92	6-Jul	18-Aug
105	1-Aug	27-Aug
107	1-Aug	16-Aug
108	1-Aug	27-Aug

Table 1. Start and End date for recording samples at all sites

Recorders were set to record for 10 minutes on the hour, beginning at 6 PM and ending at 4 AM. Recorders were left at each site a minimum of two weeks, before the data was downloaded and the recorder deployed to another site.

The data was analyzed using the Wildlife Acoustic SongScope software package, which allows for visual examination of audio files, using a spectrograph to identify the unique signals of frog and bird calls. Use of this software allows an observer to analyze a 10 minute audio data file in one or two minutes, depending on the number of species calling and strength of the chorus.

Pine barrens treefrogs were documented at 8 of the 22 sites sampled during FY12. Five of these sites were historic locations, and one of the sites was within .3mi of an historic location. The two new sites were both associated with gas line rights-of-way, as was the

site that was .3 mi from an historic site. Figure 4 indicates sample sites where pine barrens treefrogs were documented (green dots) or were not documented (purple dots) during this study.

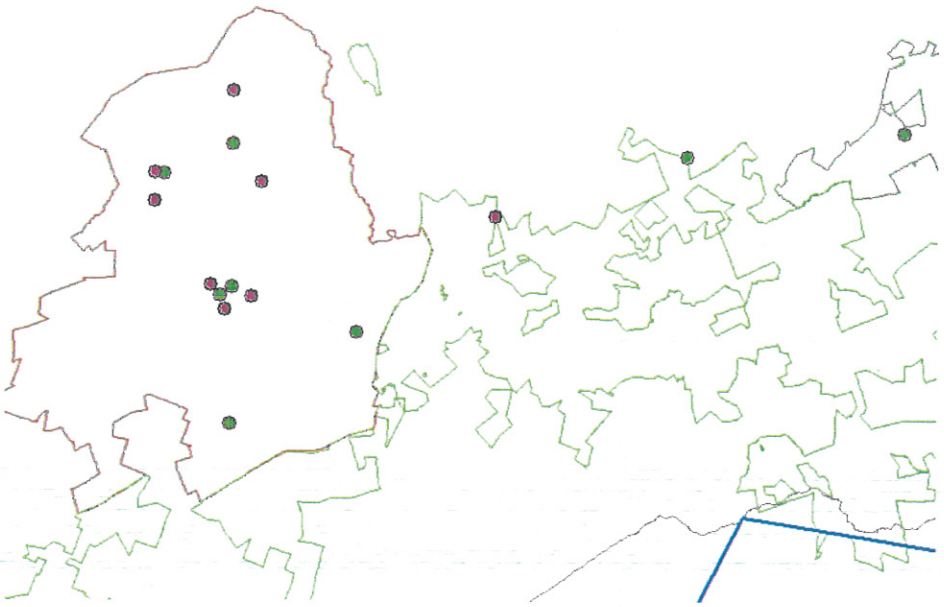

Figure 4 Locations of sample sites where pine barrens treefrogs were documented (green) or not documented (purple)

Thirteen species of frogs were documented, using the automated recorders, at SHNWR during FY12. Frogs were documented at 18 of the 22 sites sampled. Three of the sample sites were sampled late in the summer and it is possible that we missed the breeding season for all frog species at these sites. Table 2 presents the results of all species of frogs documented at all sites during FY12. Table 3 provides species names for abbreviations used in Table 2.

site	Han	Hc	Hch	Hg	Hf	Pc	Ac	Rcl	Rc	Rs	Rv	Bt	Gc
8				x		x	x	x	x	x	x	x	
53							x	x			x		x
59	x	x			x	x	x	x	x	x	x	x	
62	x		x		x		x					x	
63							x	x			x	x	
64	x	x			x		x				x	x	
65		x					x				x		
67	x		x	x	x		x	x			x		
79					x		x	x		x	x		
82	x				x		x	x	x				
85	x				x		x	x					
86							x	x		x	x		
87							x				x		
88							x	x			x		
89		x					x	x			x		
90	x						x	x				x	
92	x		x		x			x				x	

Table 2. Results of automated recorder survey for all sites

species	abbrev.
pine barrens treefrog	Han
green treefrog	Hc
Cope's gray treefrog	Hch
barking treefrog	Hg
pine woods treefrog	Hf
spring peeper	Pc
northern cricket frog	Ac
bronze frog	Rcl
bullfrog	Rcl
southern leopard frog	Rs
carpenter frog	Rv
southern toad	Bt
narrowmouth toad	Gc

Table 3 frog species names and abbreviations

The use of automated recorders and the SongScope software allows for efficient and reliable surveys for frogs. However, like any survey method it is not fool proof. There were some frog vocalizations that could not be positively identified, either due to distance or

noise levels. Pine barrens treefrogs may have been calling at sites 89 and 65, or at some distance from these sites, mixed into a chorus of green treefrogs. Additionally a call that was intermediate between the pine barrens treefrog and the barking treefrog was recordedwhich may have been a hybrid between these two species.

In the second and third year of this project we recommend re-sampling sites that were sampled late in the summer and historic sites where no pine barrens treefrogs were documented during FY12. We also recommend that SHNWR allow prescribed fire to burn into the pocosin stream edges in historic locations where fire has been excluded from the ecotone and sample these sites post-burn.

One observation worth noting is that the historic location known as Oxpen seep, which has supported a large breeding population of pine barrens treefrogs in the past did not support a large breeding population during the FY12 surveys. This site has been burned annually for several years and the shrub component at the site is greatly reduced and almost eliminated. Another site, 67, at which fire had recently burned through the pocosin and ecotone, supported a very large breeding population of the frog. There were, however no hillside seeps or bogs at this site, but there were shallow pools where the fire had burned out the sphagnum and the calling male treefrogs were all in the vicinity of these pools.

Pine barrens treefrogs have been documented to use gas and power-line rights-of-way as breeding sites and several breeding populations were documented at such sites on SHNWR and SHSF during FY12. Previously it was thought these sites are selected because the mechanical maintenance of the rights-of-way results in the open sedge-bog habitat thought to be preferred breeding sites for the species. The observations at Oxpen seep, during FY12 may indicate that the open seep or bog habitat is only one component of preferred breeding habitat and that the proximity of pocosin shrubs, from which the males call may also be of critical importance. Additionally, the observations at site 67 may indicate that seeps may not be required for breeding habitat, but any shallow pool at the ecotone of the pocosin streams may be suitable.

We recommend that further research into what constitutes suitable breeding habitat for the pine barrens treefrog be included in this project in the remaining two years.

Pine barrens treefrog

Gopher frog

Patchnose salamander

Eastern diamondback rattlesnake

Job 2. Isolated Freshwater Ponds and Gopher Frog

Objective 1. Map and assess habitat of isolated freshwater ponds on SCDNR coastal properties, and other sites where access is available, which could be used as breeding sites by gopher frog, flatwoods salamander, dwarf siren, and tiger salamander. Document the presence of these species and characterize the amphibian and reptile community associated with ponds using dip-net, minnow trap and frog call surveys.

Accomplishments.

During FY12 SCDNR staff placed automated recording devices in four known gopher frog breeding ponds and three additional ponds, located on SCDNR property that were possible breeding ponds. Figure x indicates the general location of the ponds that were sampled.

Typically gopher frogs breed in South Carolina beginning in late winter through early spring. Breeding events are triggered by large rainfall events that re-fill the isolated ponds this species requires for breeding habitat. A severe drought, which began during the summer of 2011 and persisted through the winter and early spring of 2012 precluded gopher frogs from breeding during FY12. Only one of the sample ponds (C7 Webb) held sufficient water for significant frog breeding. The results of the automated recorder surveys for 2012 are presented in Table 1. Table 2 provides the frog species names and abbreviations.

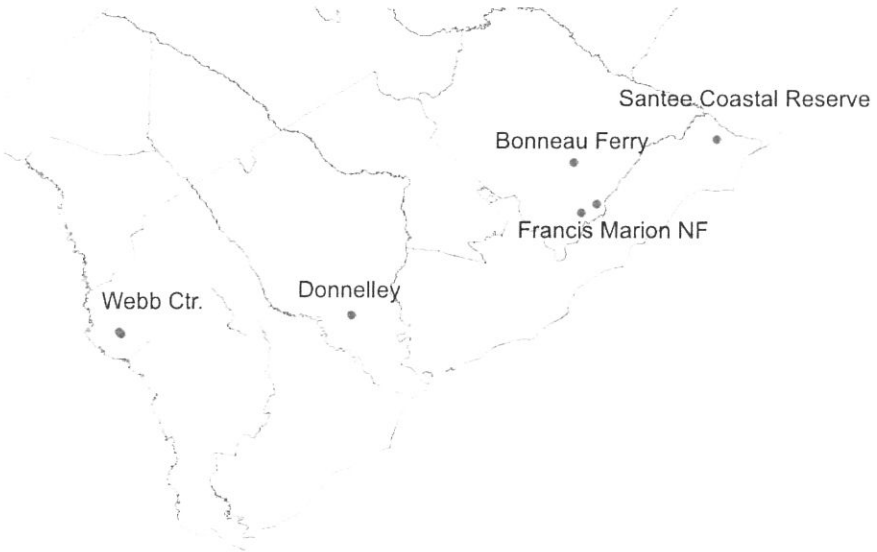

Figure 1. Location of ponds sampled for gopher frogs during FY12

species C7 Webb Mike's Webb Wildcat SCR Firetower FMNF Sunset FMNF Bonneau Ferry

Table 1. Results of automated recorder surveys for gopher frogs in FY12

species	abbrev.
little grass frog	Poc
southern chorus frog	Pn
spring peeper	Pc
ornate chorus frog	Por
pine woods treefrog	Hf
Cope's gray treefrog	Hch
squirrel treefrog	Hsq
southern cricket frog	Ag
southern leopard frog	Rs
southern toad	Bt

Table 2. Species names for abbreviations used in Table 1